

Understanding & Implementing Industrial IoT

2021



An Introduction to Industrial IoT

Software has become a crucial tool used by almost every industry from manufacturing to hospitality. These software solutions are becoming more distributed over multiple processes, heterogeneous hardware, and business domains. Industrial IoT or IIoT is a consequence of such widely spread computing ubiquity and interconnections. This includes intelligent networking between machines, processes, and data ranging from individual setups to the entire production line enabling new business models with smarter devices and services.



The Industrial Internet of Things (IIoT) promises a massive set of benefits along with new revenue streams and better visibility into existing processes. With every connected sensor, device, and machinery, business leaders are eager to extract value leveraging big data analytics, automation, and real-time computing. While IIoT remains one of the holistic approaches for industries navigating the COVID-19 pandemic to emerge stronger and resilient, market leaders should know the best practices of implementation to compete in the market of growing uncertainties regardless of the circumstances.

iLink Digital, a gold level Microsoft partner, has helped global companies to deliver excellence for almost two decades now. With this e-book, we aim to propose the best practices along with the benefits of deploying IIoT solutions and how you can implement them to achieve your business goals. This e-book also explores future possibilities of Industrial IoT and how your business can start leveraging it today.

Understanding the Spectrum of Industrial IoT

With the digital ecosystem of interconnectivity, automation, machine learning, and real-time data, internet cloud computing is turning to a new phase in the Industrial Revolution. This digital transformation mechanism, facilitating improvement in productivity, efficiency, and many economic benefits are called Industry 4.0 or the fourth industrial revolution. This is also referred to as the Industrial Internet of things (IIoT), evolving and merging into a space of the fourth generation of automation.

While every company and organization has their own unique challenges, IIoT offers to create a better-connected ecosystem that focuses on real-time insights across processes and products. A Gartner study indicates that 80% of surveyed organizations that have adopted IoT are achieving “better-than-expected results.”

While IIoT does fall under IoT, there is a key difference between the two. IoT is most commonly used for consumer usages such as smartwatches and smart home devices while IIoT concentrates on Industrial purposes such as manufacturing, supply chain monitor, and management system.



In manufacturing specifically, IIoT holds great potential for increasing the degree of automation, optimizing processes, operational efficiency, reduced cost, improved quality, and lesser error. ITIF research reports, IoT applications for monitoring machine utilization can increase manufacturing productivity by 10 to 25% and produce up to \$1.8 trillion in global economic value by 2025.² Other industries leveraging IIoT are healthcare, automotive, agriculture, and utilities.

How Does Industrial IoT Work?

IoT encompasses industrial applications that can operate independently or semi-independently with minimal human intervention. This includes robotics and software-defined production process with a strong focus on machine-to-machine (M2M) communication. It also focuses on big data and machine learning, enabling better efficiency and reliability in industry operations.

With machine-to-machine communication, these systems can intelligently respond and even change their course of action based on the data received through the feedback loops established within the framework. The motive behind this is to reduce human involvement as much as possible and increase accuracy to achieve the highest level of automation.

These intelligently connected devices transmit information directly to the data communications infrastructure and convert it into actionable insights enabling businesses to make informed decisions. These insights are also used for predictive maintenance as well as to optimize business processes.

Click below link for understanding what iLink is doing in Industrial IoT

<https://www.youtube.com/watch?v=K35vXZ9ZfTE>

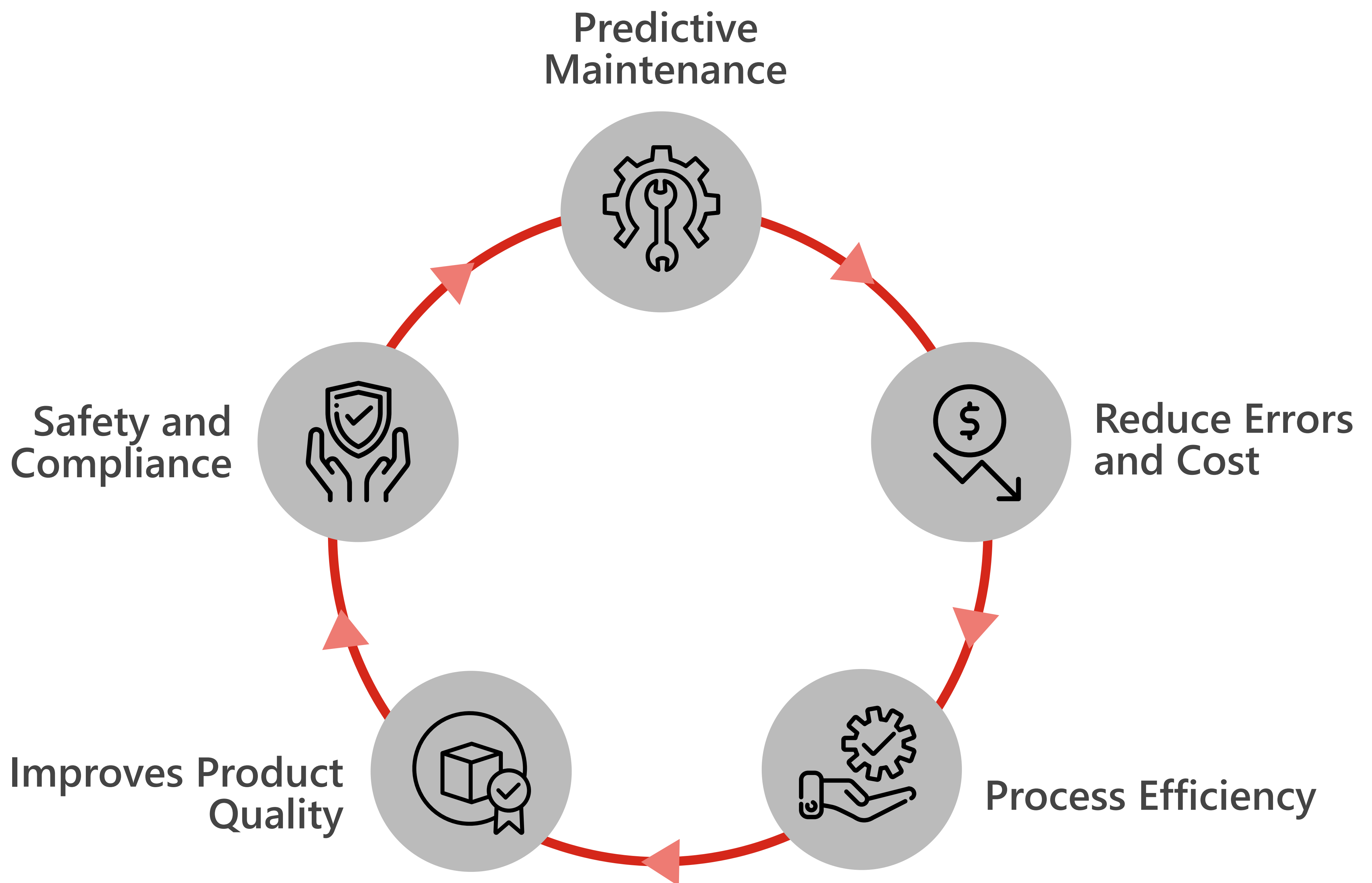


Benefits of Industrial IoT

According to a survey by IoT giant, Microsoft found that 85% of companies have at least one IoT use case project. This number will increase, as 94% of respondents said they will implement IoT strategies by 2021.³ Even IDC predicts that spending on IoT technology will reach a trillion US dollars by 2022.

So what can industry leaders expect from Industrial IoT solutions?

Here are the top 5 benefits of adopting a fully connected IoT operation:



1 - Predictive Maintenance

Nothing impacts a manufacturing operation as negatively as machine downtime. A whopping 98% of organizations report that a single hour of downtime costs them over \$100,000.5 Hence it's crucial for manufacturers to ensure that all machines and equipment function at their optimal performance levels.

With predictive maintenance powered by Industrial IoT, machinery performance and function can be monitored consistently. This empowers companies with the information they need to identify issues before they happen. It also provides manufacturers with a better understanding of how systems work and how they can experience a breakdown, saving the company's valuable time, money, and resources.

Predictive maintenance also enables monitoring tests while machines are still in operation, without a loss in productivity. An organization can only achieve better operational efficiency by proactively addressing its machines and maintaining them to extend their life by years.

2 - Reduce Errors and Cost

Minimizing the damage caused by human errors is a top priority across industries. By integrating Industrial IoT, businesses can mitigate damage to improve process efficiency, and save money. How IoT reduces cost varies by the setup of the industry, a reduction in overall maintenance costs and safety compliance is common.

Real-time data and predictive maintenance help managers to identify which machines need maintenance. In case of breakdowns, IIoT tools can diagnose problems faster and accurately. It also reduces training costs and the churn rates for employees and improving their work satisfaction.

3 - Process Efficiency

The most significant benefit of IIoT is that it empowers manufacturers to optimize their operational efficiency. Robotics and automation help machines to work more efficiently and accurately streamlining industry functions, saving resources, and boost productivity. As one study from the American Association for Quality (ASQ) found, **companies shifting to digital processes and Industrial IoT have seen as high as 82% increase efficiency accompanied by 49% fewer defects.**

With the interconnectivity of devices, manufacturers have better insights into data and analytics of the functional areas such as supply chain, energy consumption, machine maintenance, quality of production, and industrial engineering. This contributes directly to the improvement of an integrated system and helps in making data-driven decisions. Thus, the Industrial IoT's operational efficiency affects the bottom line revenue within the manufacturing industry.

4 - Improves Product Quality

Just as Industrial IoT is driving improvements in productivity and efficiency, they are also enhancing product quality. IoT sensors collect product data and third-party data associated with each stage in the product cycle. This data allows a better understanding of the processes and helps to identify the impact of external factors such as temperature or other environmental factors on the final product.

Additionally, data helps to look into customer feedback, allowing manufacturers to identify and amend quality issues during production. This unprecedented transparency and traceability into product genealogy at every level of the supply chain help manufacturers to create more value for customers increasing customer loyalty and revenues.

5 - Safety and Compliance

Smart manufacturing powered by data and sensors is also helping to bolster workplace safety in manufacturing operations. Sensors are used to monitor workers' locations while operating machines or repairing a remote part in the facility. In the case of accidents, IoT-connected sensors can send alerts to ensure immediate actions and faster rescue. Such incidents can also generate valuable data to prevent a similar occurrence in the future.

Wearable technology is also being utilized by employees to keep a tab on their health and surroundings to ensure safety protocols are followed. These wearables can improve work conditions and performance.



Scope of Industrial IoT in times of Pandemic

With the 2nd and 3rd waves of the COVID-19 crisis enveloping the countries, industry leaders are in a constant effort to maintain their operations while ensuring their employees' safety and security. This imperative has earned industrial IoT significant attention with its plug-and-play mode as it also deals with onsite employee protection. Industrial IIoT tools support the continuation of operations with fewer employees on site. It collects and provides valuable information regarding the manufacturing process that managers can discuss even while working remotely.



In case of machine breakdowns, IIoT tools such as digital heat maps receive input from sensors that help to detect problems and analyze root causes. It also facilitates workforce tracking to optimize the workflows and minimize contact between changes of shifts. It can alert onsite employees if there are too many people in a certain area. It can also inform management about short-staffed areas to avoid slowdowns and increase productivity.

If employees test positive, companies can use data from employees' tracking devices and notify all the other employees who might have come in close proximity with the infected person. Vision-based control systems also help managers to analyze video feeds combined with infrared imaging to detect fever. Together, IIoT tools can assist industry leaders in a seamless transition from on-field to remote working ensuring their employees safe and production going.

Read in detail: How is Industrial IoT Making Manufacturing Safe?

<https://www.ilink-digital.com/insights/blog/how-is-industrial-iiot-making-manufacturing-safe/>

Best practices of Implementing IIoT

The Industrial Internet of Things (IIoT) benefits go beyond proof of concept, yet it does bring some serious challenges as companies start to accelerate their digital transformation. Poorly implemented IoT comes with the risk of higher cost investment, cybersecurity issues, connectivity outages, or other problems associated with a lack of standardization between legacy tools and new additions.

Before implementing Industrial IoT, industry leaders must follow the best practices to get an insight into real-world IIoT implementation. These practices reduce the risks in deployments and help to integrate broader digital transformation initiatives in the long term.



Plan for an evolving data model



Keep end-users in mind



Establish Highest Security Standards



Check for Agility



Bring Legacy Systems Online



Choose the right IoT Platform

1 - Plan for an evolving data model

The Internet of Things is about data sharing between sensors and networked devices. Every IoT application has a data model consisting of user-generated data, data from the devices, and data from outside systems.

IoT data modeling interprets, analyze and share data efficiently among heterogeneous applications and devices. It supports the use cases for which the system is being designed. Planning for an evolving data model, keeps you updated with data and other schemas over the lifespan of the system.

This API-accessible datastore helps IoT systems to function properly. Modeling the data elements as well as the metadata that goes with them creates a rich, contextualized graph that algorithms can use to convert data into information. IoT data only becomes meaningful when linking it to your internal business logic and strategic goals as it helps to identify the feasibility and impact of the IoT project.

2 - Keep end-users in mind

With IIoT deployment comes a massive amount of data. Since industry leaders use collected data to make important industrial decisions, it's natural for them to question how they can best manage and transform it into actionable information. One best solution is to develop data strategies keeping the end-user in mind.

As per a report from the Inmarsat Research Programme, a strong correlation exists between the strength of an organization's data strategy and its understanding of the consumer. The report notes that developing strategies around analysis, security, and information sharing are essential for ensuring that organizations achieve their target outcomes.

3 - Establish Highest Security Standards

Networking machine tools and industrial plants with the cloud requires the highest security standards. Failing to detect threats or to implement proper data protection measures can lead long term damage including costly service disruptions, regulatory fines, stolen IPs, and disgrace to the organization's reputation.

However, there are also a few things to observe at the end of an application and device. One core thing is to consider Security Development Lifecycle (SDL) at every software development process. Other methods include modern encryption processes that authenticate and authorize all components and users.

Users are recommended to use multifactor authentication to protect their accounts from being misused. To mitigate malicious breaches, smart devices and IoT gateways should be individually authenticated and granted limited rights. To avoid providing a route of attack, devices should be physically secured and never have open ports to a network outside the system.

4 - Check for Agility

The Industrial IoT requires speed. If a project takes much longer than 6 months, the company's strategies and goals may have already changed. This can result in the termination of the project. Agility is essential in every IoT project phase and not just during the actual solution development. As Gartner states, people who implement IoT projects often underestimate the complexity of IoT integration and overestimate the built-in integration capabilities of their IoT platforms.

Another advantage that IIoT offers is that it keeps constantly improving as existing products evolve and new categories emerge. However, organizations should remain critical about the possibilities of the way a solution is used to get the exact data needed. Through continuous service and a thorough evaluation, companies can check if they are agile enough to derive value from the IIoT solution now and in the future.

5 - Bring Legacy Systems Online

Modern industrial manufacturing operations that have either upgraded to or launched with the industrial internet of things (IIoT) technologies are benefiting from competitive advantages over those that solely rely on legacy systems. This evolution has catalyzed growth estimates of global spending on IIoT platforms for manufacturing from \$1.67 billion in 2018 to \$12.44 billion in 2024, attaining a 40% compound annual growth rate (CAGR) in seven years, according to Forbes.⁸

Although IIoT has come a long way, piloting new technology in a legacy setting can be a challenging task due to the potential unfamiliarity with the different platforms. Thus owners, operators, and managers must collaborate to determine which system will benefit the most from the integration of IIoT devices.

One of the first steps when augmenting legacy industrial systems is to add sensors. Installing sensors provides added controls and visibility, reducing the risk by detecting performance deviation, allowing pre-emptive maintenance, and saving cost. Shifting perceptions about augmenting existing systems from a technology issue to a business one is an effective way to help overcome future apprehensions.

6 - Choose the right IoT Platform

“Like an operating system for a laptop, a platform does a lot of things in the background that makes life easier and less expensive for developers, managers, and users.”

Mckinsey Digital

Choosing the right IoT platform can be a complex endeavor especially when the market is crowded with vendors offering varying value propositions. But for the IoT platform, there is no one size fits all project. Much of it depends upon your business model and type of services offered, resources available, compatibility, device management, and some other key capabilities.

An enterprise-ready Industrial IoT platform facilitates device integration with enterprise applications. This enables the seamless yet secure flow of data and helps organizations to build their IoT environment on a solid foundation. It also removes risks associated with adoption, reduces costs, accelerates time-to-market, and maintains quality standards. Thus pilot projects and mass deployments are simplified along with conditional monitoring and predictive maintenance.

Most important practice: Finding the right technology partner

Despite being one of the most important steps, finding a one-stop technology partner is a task in itself. An approach can only be successful when it empowers the operations in the field, therefore, it's crucial to collaborate with the right partner to focus on your area of expertise.

iLink Digital is at the forefront of the digital transformation initiative. As a Global Software Solution Provider and Systems Integrator, iLink's solutions are used in a broad range of industries and functions. We have been a consistent recipient of the Microsoft Partner of the year awards.

Our high-performing teams are continually building a comprehensive approach to manage all challenges that Industrial IoT brings. We have helped our clients to identify solutions that best support their business goals and develop an IIoT roadmap for successful deployment.

If you are considering Industrial IoT for your enterprise, our professional team is ready to turn your vision into reality.

Get in touch with our experts.

<https://www.ilink-digital.com/services/internet-of-things/industrial-iiot/>